# 1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Oakland Operations Office is responsible for the operation of the Energy Technology Engineering Center (ETEC), a government-owned complex of buildings located within Area IV (approximately 1.2 square kilometers [290 acres]) of the Santa Susana Field Laboratory (SSFL) (*see* Figure 1-1). The 11-square-kilometer (2,850-acre) SSFL is located atop a range of hills between the Simi and San Fernando Valleys in southeastern Ventura County, California. ETEC is operated by Rocketdyne Propulsion & Power, a division of The Boeing Company. ETEC does not have specific site boundaries, but rather is a group of facilities owned by DOE or where DOE-sponsored operations took place.

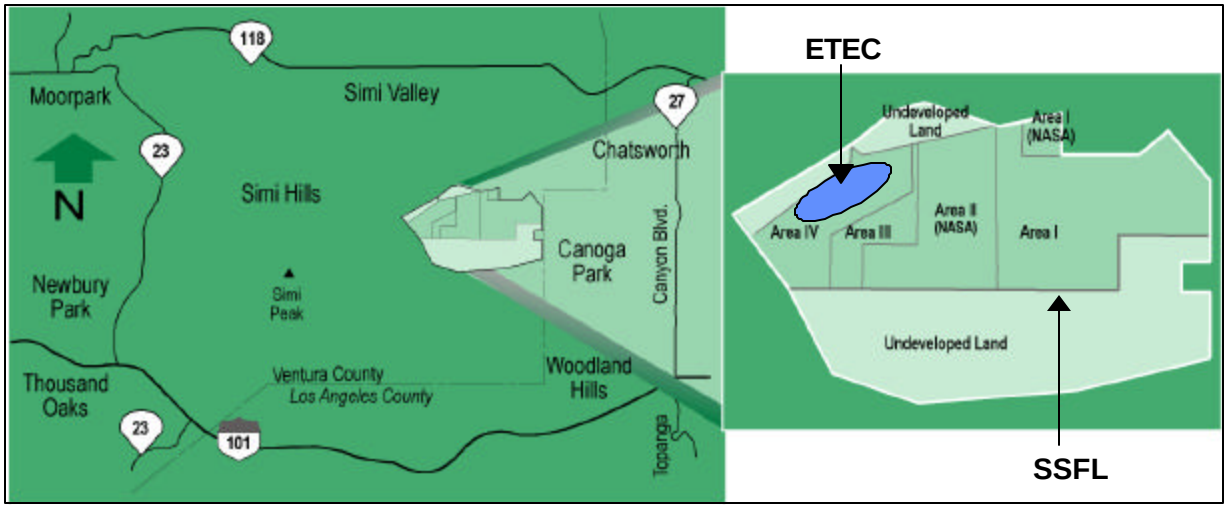


**Figure 1-1. Location of SSFL, Area IV, and ETEC**

From the mid-1950s until the mid-1990s, DOE and its predecessor agencies conducted nuclear research and energy development projects at ETEC. Activities in Area IV of the SSFL sponsored by DOE included nuclear operations (development, fabrication, disassembly, and examination of nuclear reactors, reactor fuel, and other radioactive materials) and large-scale liquid sodium metal experiments for testing liquid metal fast breeder reactor components. The use of radioactive materials at the SSFL was restricted to Area IV only. As a result of these and other activities, various facilities and locations on the site contain radioactive and chemical contamination. Hazardous materials such as asbestos insulation and lead-based paint may also be present in some buildings. The remainder of Area IV and the SSFL are not owned or controlled by DOE.

All nuclear research at ETEC terminated in 1988. Since then, many of the previously used nuclear facilities and associated site areas have been decontaminated and decommissioned. Decontamination and decommissioning activities at the sodium test facilities began in 1996.

As public concern over cleanup activities at ETEC increased, DOE decided to conduct an environmental assessment (EA) under the National Environmental Policy Act (NEPA) of its remaining cleanup activities. (Previous closure activities at the site were performed under NEPA through categorical exclusions). DOE has prepared this EA to evaluate the potential impacts of implementing additional

cleanup and closure activities. The EA was prepared in accordance with the Council on Environmental Quality's NEPA implementing regulations (40 CFR Parts 1500-1508) and DOE's NEPA implementing regulations (10 CFR Part 1021).[1] A notice of intent was published in the *Federal Register* on September 15, 2000, announcing DOE's decision to prepare this EA and hold public scoping meetings (65 Fed. Reg. 55949 (2000)). The EA was issued in draft for public comment. The initial 30-day public comment period, during which DOE conducted a public meeting on the draft, was extended for an additional 60 days at the request of commenters.

DOE will use this EA, and other relevant information, to determine (1) if the current cleanup standard for the radiological cleanup of ETEC facilities and all Area IV land for which DOE is responsible is appropriate for the remaining activity, and (2) whether to decontaminate and decommission the remaining sodium facility and other support facilities. The chemical contamination in soil and groundwater will be addressed under the Resource Conservation and Recovery Act (RCRA) Facility Investigation process.

## 1.1 PURPOSE AND NEED

DOE determined in 1996 that ETEC is surplus to its current needs and is closing the site. However, DOE is responsible for the remaining radioactive and chemical contamination from its activities and is proposing to clean up the affected portion of Area IV prior to turning the area over to Rocketdyne. There are no radiological facilities outside of Area IV. DOE now needs to decide the most appropriate cleanup and closure procedure for the radiological contamination and hazardous materials remaining at ETEC.

## 1.2 ALTERNATIVES

DOE is proposing to clean up the remaining ETEC facilities using the existing site-specific cleanup standard of 15mrem/yr. (plus DOE's As Low As Reasonably Achievable – ALARA-principle) for decontamination of radiological facilities and surrounding soils (**Alternative 1**). An annual 15-millirem additional radiation dose to the maximally exposed individual (assumed to be an individual living in a residential setting on Area IV) from all exposure pathways (air, soil, groundwater)[2] equates to an additional theoretical lifetime cancer risk of no more than $3 \times 10^{-4}$ (3 in 10,000) (*see* the text box titled "Exposure to Radiation" for an explanation of terms relating to radiation exposure).

**Cancer Risk from Radiation**

Background radiation is radiation from naturally occurring radioactive materials as they exist in nature (such as radon) and cosmic rays from space filtered through the Earth's atmosphere. Other sources of background radiation include medical procedures (x-rays), air travel, consumer and industrial products, and fallout from prior nuclear weapons testing. On average, individuals in the United States receive 300 millirem annually from background radiation. The probability of incurring a fatal cancer as a result of exposure to background radiation is approximately $1 \times 10^{-2}$ (1 in 100) over a 70-year lifetime. Additional information is available in Appendix C.

In this EA, the term "additional theoretical lifetime fatal cancer risk" refers to the potential risk of developing a fatal cancer that could result from exposure to radiological contaminants *over and above* the existing risk of dying of cancer.

[1] Earlier decontamination, decommissioning, and demolition activities at ETEC were conducted pursuant to categorical exclusions issued in accordance with DOE's NEPA regulations (10 CFR Part 1021, Appendix B to Subpart D).

[2] DOE established the soil release criteria for ETEC in September 1996. A detailed discussion of the soil cleanup standard is found in *Approved Sitewide Release Criteria for Remediation of Radiological Facilities at the SSFL* (Rocketdyne 1999a).

However, actual exposures generally will be much lower as a result of the application of the "as low as reasonably achievable" (ALARA) principle (*see* additional information in Chapter 3 and Appendix G). Based on post-remediation verification sampling previous cleanups have resulted in a less than $2 \times 10^{-5}$ level of residual risk. DOE would decontaminate, decommission, and demolish the remaining radiological facilities. DOE would also decommission and demolish the one remaining sodium facility and all of the remaining uncontaminated support buildings for which it is responsible. The ongoing RCRA corrective action program, including groundwater treatment (interim measures), would continue. Alternative 1 is DOE's preferred alternative.

**Exposure to Radiation**

As a result of past radiological activities at ETEC, Area IV contains radioactive contamination in various facilities and locations. The decontamination activities that would be undertaken under the alternatives analyzed in this EA could expose workers to radiation and contaminated material. These activities could also expose the public to very small quantities of radioactive materials from controlled releases to the atmosphere. Even after decontamination activities were completed, extremely small levels of radioactivity could remain. Radiation may cause a variety of ill health effects in people, including cancer.

To determine whether health effects could occur as a result of radiation exposure from a particular activity and to determine the extent of such effects, the radiation dose must be calculated. An individual may be exposed to radiation externally (through a radiation source outside of the body) and/or internally (from ingesting or inhaling radioactive material). The dose is a function of the exposure pathway (for example, inhalation, ingestion, or external exposure through the skin) and the type and quantity of the radionuclides involved.

The unit of radiation dose for an individual is the *rem*. A *millirem* is 1/1,000 of a rem. The unit of dose for a population is *person-rem* and is determined by summing the individual doses of an exposed population. The impacts from a small dose to a large number of people can be approximated by the use of population (that is, *collective*) dose estimates. Dose estimates are usually derived for both the *maximally exposed individual* (a member of the public located nearest to the site during decontamination, decommissioning, and demolition activities or, following remediation, a person who would live on the site for 40 years) and the *collective population* within 80 kilometers (50 miles) of the site.

After the dose is estimated, the health impact is calculated from current internationally recognized risk factors. The potential health impact is stated in terms of a *latent cancer fatality*. A latent cancer fatality is a fatality resulting from a cancer that was originally induced by radiation but which may occur years after the exposure. Small doses of radiation may result in fractional latent cancer fatalities, or only a probability that a latent cancer fatality may be incurred. The lower the fractional latent cancer fatality, the lower the probability that a latent cancer fatality will be incurred. For example, $1 \times 10^{-4}$ probability of a latent cancer fatality means 1 chance in 10,000 of incurring a latent cancer fatality; $1 \times 10^{-6}$ probability of a latent cancer fatality means 1 chance in 1 million of incurring a latent cancer fatality.

For this EA, DOE also analyzed an alternative that would clean up the ETEC site using a 0.05-millirem standard (**Alternative 2**). A 0.05 mrem exposure would result in an additional theoretical lifetime cancer risk of no more than $1 \times 10^{-6}$ to the maximally exposed individual over 40 years. As under Alternative 1, DOE would also decommission and demolish the remaining sodium facilities and all of the remaining

uncontaminated support buildings for which it is responsible. Ongoing groundwater treatment (interim measures) and the SSFL site-wide RCRA corrective action would continue.

**Routine Radiation Exposure**

Below are radiation doses associated with various activities (UNSCEAR 1993):

| | |
|---|---|
| 3 chest x-rays | 18 millirem |
| 2 round-trip cross-country airplane trips | 14 millirem |
| Living for 1 year in a brick house | 7 millirem |
| Living in Denver for 1 year (above sea-level exposure) | 21 millirem |
| Total average annual exposure to background radiation | 300 millirem |

The Council on Environmental Quality regulations implementing NEPA require agencies to consider the no action alternative as a baseline against which the environmental impacts of the proposed action and alternatives can be measured. For this EA, DOE analyzed the potential impacts of leaving the site in its current state (**No Action Alternative**). Under the No Action Alternative, DOE would conduct no further cleanup of radiological facilities or soil or cleanup of the remaining sodium and other support facilities for which it is responsible. Rather, Rocketdyne would prohibit or control access to contaminated facilities, soil, groundwater, and surface water and continue groundwater treatment. However, the ongoing RCRA corrective action program would continue.

The specific activities that would be conducted under each of these alternatives are discussed fully in Chapter 3, Proposed Action and Alternatives. Other alternatives DOE considered but concluded were not reasonable based on initial review are also summarized in Chapter 3.

## 1.3 PUBLIC INVOLVEMENT

### 1.3.1 Scoping

The public scoping period began with the September 15, 2000, publication in the *Federal Register* of the notice of intent to prepare an EA and continued until October 30, 2000. During the scoping period, DOE conducted public scoping meetings on October 17, 2000, in Woodland Hills, California, and on October 18, 2000, in Simi Valley, California (Atkinson-Baker 2000a, 2000b). Information on the upcoming scoping meetings was published in local public notices prior to the meetings as well as in mailings to interested parties.

The public was encouraged to comment on the proposed scope of the EA, suggest other site cleanup alternatives, express any concerns regarding ETEC and proposed actions, and provide any other information or comments that DOE should consider in the course of developing the EA. The scoping process was used to help determine issues to be addressed, identify significant issues related to the proposed action, identify and eliminate issues that were not significant or were covered by another environmental review, and develop a range of alternatives for analysis. In fact, DOE added Alternative 2, the 0.05mrem cleanup standard at the request of stakeholders.

**U.S. Environmental Protection Agency (EPA) Cleanup Policy**

Consistent with DOE policy, cleanup activities at ETEC are being conducted consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601 *et seq*).

The regulations issued by the EPA for CERCLA state that CERCLA cleanups need to achieve a cleanup level such that there is an upper bound lifetime cancer risk to an individual of between $1 \times 10^{-4}$ to $1 \times 10^{-6}$ resulting from exposure to residual contamination after the cleanup is complete (*see* 40 CFR 300.430(e)(2)(i)(A)(2)). EPA has stated that a site-specific 15-millirem annual dose cleanup standard, equating to an increased lifetime cancer risk to an individual of approximately $3 \times 10^{-4}$, "is consistent with levels generally considered protective in other governmental actions, particularly regulations and guidance developed by EPA in other radiation control programs" (EPA 1997).

More recently, EPA has adopted "very stringent public health and environmental protection standards" for the proposed high-level radioactive waste and spent nuclear fuel repository at Yucca Mountain, Nevada. Under these standards, residents closest to the repository would be exposed to no more than 15 millirem annually from all pathways (EPA 2001a). Further, EPA has stated that a 25-millirem standard used by the U.S. Nuclear Regulatory Commission (NRC) for the cleanup of the West Valley Demonstration Project in West Valley, New York, "will result in a residual risk within the [CERCLA] risk range of $10^{-4}$ to $10^{-6}$" (EPA 2001b).

Appendix A summarizes the comments received during scoping and DOE's responses to these comments. Appendix B provides a list of agencies and persons consulted regarding the preparation of this EA.

### 1.3.2 Public Comments on the Draft EA

DOE issued a draft version of this EA for public comment in January 2002, and held two sessions of a public meeting on the draft document on January 24, 2002, during which 16 people presented comments. In addition, during the 90-day comment period that ended on April 26, 2002, DOE received 63 comment letters, electronic mail messages, and verbal communications on the Draft EA from individuals; groups; and federal, state, and local governmental entities. DOE has considered these comments individually and collectively and has made many changes to the Draft EA as a result of the comments. These changes are reflected in this Final EA. DOE's specific responses to the issues raised in the public comments are provided in Appendix I.

## 1.4 ORGANIZATION OF THE EA

The EA consists of six chapters and nine appendices. **Chapter 1** is a brief introduction to DOE's purpose and need for action, the alternatives analyzed, and the means by which the public has been and can continue to be involved with the preparation of the document and DOE's decisionmaking process.

**Chapter 2** provides background information regarding the history of the site, regulatory requirements involving ETEC site cleanup, the facilities that are the subject of this EA, waste management activities on the site, and the current status of the site.

**Chapter 3** describes the proposed action and alternatives analyzed in the EA. This chapter includes a table that summarizes and compares the potential environmental impacts associated with each alternative.

**Chapter 4** describes the affected environment and environmental consequences that could occur under each alternative. For each resource area, the EA describes the current conditions at the site and the potential environmental impacts of implementing the alternatives. The resource areas analyzed are land use, geology and soils, air quality, water quality and water resources, human health, biological resources, cultural resources, noise and aesthetics, socioeconomics, waste management, transportation, environmental justice, and cumulative impacts.

**Chapter 5** addresses unavoidable adverse environmental impacts, the relationship of short-term uses of the environment and long-term productivity, and irreversible and irretrievable commitments of resources.

**Chapter 6** contains a list of the documents used in the preparation of this EA.

**Appendix A** summarizes scoping comments and provides DOE responses. **Appendix B** lists the individuals and agencies consulted and contacted during the preparation of this EA. **Appendix C** provides additional information on radiation and human health. **Appendix D** identifies endangered, threatened, and sensitive species that have been observed or that could occur at the SSFL. **Appendix E** provides information regarding the methodology used to collect the soil data used as the basis for the analysis in the EA. **Appendix F** discusses radionuclides of concern at Area IV. **Appendix G** provides information regarding the ALARA principle and process. **Appendix H** describes the methodology used to assess air quality impacts. **Appendix I** summarizes the public comments received on the Draft EA and DOE's responses to the issues raised in the comments.